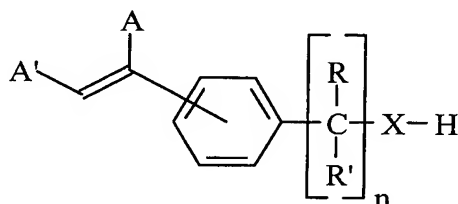


WHAT IS CLAIMED IS:

1. A process for preparing an ethylenically unsaturated macromer comprising

(A) reacting

5 (1) a monofunctional compound represented by the formula:



wherein:

10 A and A': each independently represent a hydrogen atom, an alkyl group containing from 1 to 10 carbon atoms which may or may not be substituted with one or more halogen atoms, or an aryl group containing from 5 to 6 carbon atoms which may or may not be substituted with one or more halogen atoms;

15 n: represents 0 or 1;
X: represents an oxygen atom or a sulfur atom;

and

20 R and R': each independently represent a hydrogen atom, or an alkyl group containing from 1 to 10 carbon atoms which may or may not be substituted with one or more oxygen atoms or one or more halogen atoms;

with

25 (2) at least one alkylene oxide containing from 2 to 8 carbon atoms, wherein the carbon atoms may be aliphatically bound, aromatically bound, cycloaliphatically bound or a combination thereof;

in the presence of

(3) at least one non-cationic alkoxylation catalyst.

2. The process of Claim 1, wherein (3) said alkoxylation catalyst comprises a double metal cyanide catalyst.

5

3. The process of Claim 1, wherein in said monofunctional compound:

10 A and A': each independently represents a hydrogen atom, a methyl group, an ethyl group, a propyl group, a butyl group, a hexyl group, a cyclohexyl group, a phenyl group, or a chloromethyl group;

n: represents 0 or 1;

X: represents an oxygen atom or a sulfur atom;

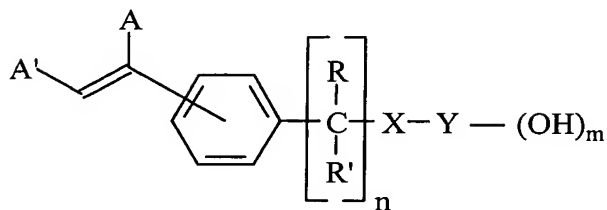
and

15 R and R': each independently represents a hydrogen atom, a methyl group, an ethyl group, a propyl group, a butyl group, a pentyl group, a cyclopentyl group, a hexyl group, a cyclohexyl group, or a phenyl group.

20 4. The process of Claim 1, wherein said monofunctional compounds are selected from the group consisting of 3-isopropenyl-cumenol, 4-isopropenylphenol and mixtures thereof.

25 5. The process of Claim 1, wherein said alkylene oxide is selected from the group consisting of ethylene oxide, propylene oxide, butylene oxide, glycidol and mixtures thereof.

6. An ethylenically unsaturated macromer represented by the formula:



wherein:

- | | | |
|----|-----------|--|
| 5 | A and A': | each independently represent a hydrogen atom, an alkyl radical containing from 1 to 10 carbon atoms which may or may not be substituted with one or more halogen atoms, or an aryl radical containing from 5 to 6 carbon atoms which may or may not be substituted with one or more halogen atoms; |
| 10 | n: | represents 0 or 1; |
| | X: | represents an oxygen atom or a sulfur atom; |
| 15 | R and R': | each independently represent a hydrogen atom, or an alkyl radical containing from 1 to 10 carbon atoms which may or may not be substituted with one or more oxygen atoms or one or more halogen atoms; |
| 20 | Y: | represents a polymerized form of at least one alkylene oxide containing from 2 to 8 carbon atoms, wherein the carbon atoms may be aliphatically bound, aromatically bound, cycloaliphatically bound or a combination thereof, |
| 25 | and | |
| | m: | represents an integer from 1 to 15, with the proviso that when $n = 0$, $m > 1$. |

7. The ethylenically unsaturated macromer of Claim 6, wherein the molecular weight ranges from about 170 to about 30,000.

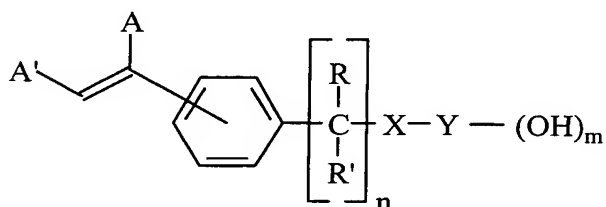
8. The ethylenically unsaturated macromer of Claim 6, wherein
- 5 A and A': each independently represents a hydrogen atom, a methyl group, an ethyl group, a propyl group, a butyl group, a hexyl group, a cyclohexyl group, a phenyl group, or a chloromethyl group;
- n: represents 0 or 1;
- 10 X: represents an oxygen atom or a sulfur atom;
- R and R': each independently represents a hydrogen atom, a methyl group, an ethyl group, a propyl group, a butyl group, a pentyl group, a cyclopentyl group, a hexyl group, a cyclohexyl group, or a phenyl group;
- 15 Y: represents a polymerized form of ethylene oxide, propylene oxide, butylene oxide, glycidol, or mixtures thereof;
- and
- m: represents an integer from 1 to 10, with the proviso
- 20 that when $n = 0$, $m > 1$.

9. The ethylenically unsaturated macromer of Claim 6, wherein the molecular weight ranges from about 3,000 to about 20,000.

- 25 10. The ethylenically unsaturated macromer of Claim 6, wherein the molecular weight ranges from about 3,000 to about 10,000.

11. A process for preparing a pre-formed stabilizer comprising:
(A) free-radically polymerizing:

- (1) an ethylenically unsaturated macromer represented by the formula:



wherein:

- 5 A and A': each independently represent a hydrogen atom, an alkyl radical containing from 1 to 10 carbon atoms which may or may not be substituted with one or more halogen atoms, or an aryl radical containing from 5 to 6 carbon atoms which may or may not be substituted with one or more halogen atoms;
- 10 n: represents 0 or 1;
- X: represents an oxygen atom or a sulfur atom
- R and R': each independently represent a hydrogen atom, or an alkyl radical containing from 1 to 10 carbon atoms which may or may not be substituted with one or more oxygen atoms or one or more halogen atoms;
- 15 Y: represents a polymerized form of at least one alkylene oxide containing from 2 to 8 carbon atoms, wherein the carbon atoms may be aliphatically bound, aromatically bound, cycloaliphatically bound or a combination thereof;
- 20 and
- m: represents an integer of from 1 to 15;
- 25 with
- (2) at least one ethylenically unsaturated monomer;

in the presence of:

(3) at least one free-radical polymerization initiator;

and, optionally,

(4) a liquid diluent;

5 and, optionally,

(5) a chain transfer agent.

12. The process of Claim 11, wherein (1) said ethylenically unsaturated macromer corresponds to the same formula, wherein:

10 A and A': each independently represents a hydrogen atom, a methyl group, an ethyl group, a propyl group, a butyl group, a hexyl group, a cyclohexyl group, a phenyl group, or a chloromethyl group;

n: represents 0 or 1;

15 X: represents an oxygen atom or a sulfur atom;

R and R': each independently represents a hydrogen atom, a methyl group, an ethyl group, a propyl group, a butyl group, a pentyl group, a cyclopentyl group, a hexyl group, a cyclohexyl group, or a phenyl group;

20 Y: represents a polymerized form of ethylene oxide, propylene oxide, butylene oxide, glycidol or mixtures thereof;

and

m: represents an integer of from 1 to 10.

25

13. The process of Claim 11, wherein said ethylenically unsaturated macromer has a molecular weight of from about 170 to about 30,000.

30 14. The process of Claim 11, wherein (2) said ethylenically unsaturated monomer is selected from the group consisting of: styrene, acrylonitrile and mixtures thereof.

15. The process of Claim 14, wherein (2) said ethylenically unsaturated monomer comprises a mixture of styrene and acrylonitrile in a weight ratio of styrene to acrylonitrile of from about 80:20 to about 50:50.

5

16. The process of Claim 11, wherein (3) said free-radical polymerization initiator is selected from the group consisting of alkyl hydroperoxides, aryl hydroperoxides, persulfates, perborates, percarbonates, azo compounds and mixtures thereof.

10

17. The process of Claim 11, wherein (3) said free-radical polymerization initiator is present in an amount of from about 0.01 to amount 2% by weight, based on the total weight of components (1), (2), (3), (4), and (5).

15

18. The process of Claim 11, wherein (4) a diluent is present.

19. The process of Claim 18, wherein (4) said diluent is selected from the group consisting of monohydroxyl alcohols, polyols, hydrocarbons, ethers and mixtures thereof.

20

20. The process of Claim 19, wherein said monohydroxy alcohol is selected from the group consisting of methanol, ethanol, n-propanol, isopropanol, n-butanol, sec-butanol, tert-butanol, n-pentanol, 2-pentanol, 3-pentanol and mixtures thereof.

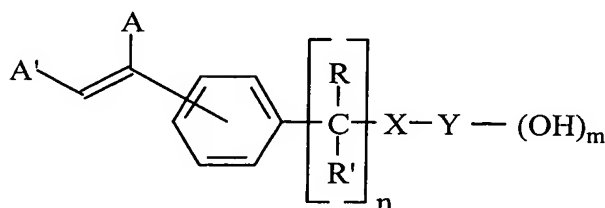
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21. The process of Claim 19, wherein said polyol comprises an poly(oxypropyleneoxyethylene) polyol having an oxyethylene content of less about 50% by weight, based on 100% by weight of oxyalkylene groups, and contains low unsaturation.

30

22. A pre-formed stabilizer comprising the free-radical polymerization product of:

- (1) an ethylenically unsaturated macromer represented by the formula:



5 wherein:

A and A': each independently represent a hydrogen atom, an alkyl radical containing from 1 to 10 carbon atoms which may or may not be substituted with one or more halogen atoms, or an aryl radical containing from 5 to 6 carbon atoms which may or may not be substituted with one or more halogen atoms;

n: represents 0 or 1;

X: represents an oxygen atom or a sulfur atom;

R and R': each independently represent a hydrogen atom, or an alkyl radical containing from 1 to 10 carbon atoms which may or may not be substituted with one or more oxygen atoms or one or more halogen atoms;

Y: represents a polymerized form of at least one alkylene oxide containing from 2 to 8 carbon atoms, wherein the carbon atoms may be aliphatically bound, aromatically bound, cycloaliphatically bound or a combination thereof;

and

m: represents an integer of from 1 to 15;

with

(2) at least one ethylenically unsaturated monomer;

in the presence of

5 (3) at least one free-radical polymerization initiator;

and, optionally,

(4) a liquid diluent;

and, optionally,

(5) a chain transfer agent.

10

23. The pre-formed stabilizer of Claim 22, wherein (1) said ethylenically unsaturated macromer is represented by the same formula, wherein:

15 A and A': each independently represents a hydrogen atom, a methyl group, an ethyl group, a propyl group, a butyl group, a hexyl group, a cyclohexyl group, a phenyl group, or a chloromethyl group;

n: represents 0 or 1;

X: represents an oxygen atom or a sulfur atom;

20 R and R': each independently represents a hydrogen atom, a methyl group, an ethyl group, a propyl group, a butyl group, a pentyl group, a cyclopentyl group, a hexyl group, a cyclohexyl group, or a phenyl group;

25 Y: represents a polymerized form of ethylene oxide, propylene oxide, butylene oxide, glycidol, or mixtures thereof;

and

m: represents an integer of from 1 to 10.

24. The pre-formed stabilizer of Claim 22, wherein said ethylenically unsaturated macromer has a molecular weight of from about 170 to about 30,000.

5 25. The pre-formed stabilizer of Claim 22, wherein (2) said ethylenically unsaturated monomer is selected from the group consisting of: styrene, acrylonitrile and mixtures thereof.

10 26. The pre-formed stabilizer of Claim 22, wherein (2) said ethylenically unsaturated monomer comprises a mixture of styrene and acrylonitrile in a weight ratio of styrene to acrylonitrile of from about 80:20 to about 50:50.

15 27. The pre-formed stabilizer of Claim 22, wherein (3) said free-radical polymerization initiator is selected from the group consisting of alkyl hydroperoxides, aryl hydroperoxides, persulfates, perborates, percarbonates, azo compounds and mixtures thereof.

20 28. The pre-formed stabilizer of Claim 22, wherein (3) said free-radical polymerization initiator is present in an amount of from about 0.01 to amount 2% by weight, based on the total weight of components (1), (2), (3), (4) and (5).

25 29. The pre-formed stabilizer of Claim 22, wherein (4) said diluent is selected from the group consisting of monohydroxyl alcohols, polyols, hydrocarbons, ethers and mixtures thereof.

30 30. The pre-formed stabilizer of Claim 29, wherein said monohydroxy alcohol is selected from the group consisting of methanol, ethanol, n-propanol, isopropanol, n-butanol, sec-butanol, tert-butanol, n-pentanol, 2-pentanol, 3-pentanol and mixtures thereof.

31. The pre-formed stabilizer of Claim 29, wherein said polyol comprises an poly(oxypropyleneoxyethylene) polyol having an oxyethylene content of less about 50% by weight, based on 100% by weight of oxyalkylene groups, and contains low unsaturation.

5

32. A process for preparing a polymer polyol comprising:

(A) free-radically polymerizing:

(1) a base polyol;

(2) the pre-formed stabilizer of Claim 22;

10 and

(3) at least one ethylenically unsaturated monomer;
in the presence of

(4) at least one free-radical polymerization initiator;
and, optionally,

15 (5) a chain transfer agent.

33. The process of Claim 32, wherein the resultant polymer polyol has a solids content of 30 to 60% by weight and a viscosity of from about 2,000 to about 10,000 cSt.

20

34. The process of Claim 32, wherein (1) said base polyol comprises a polyether polyol having a functionality ranging from about 2 to about 8, an OH number ranging from about 10 to about 180, and a molecular weight ranging from greater than about 600 to about 15,000.

25

35. The process of Claim 32, wherein (3) said ethylenically unsaturated monomer is selected from the group consisting of styrene, acrylonitrile and mixtures thereof.

30 36. The process of Claim 35, wherein (3) said ethylenically unsaturated monomer comprises a mixture of styrene and acrylonitrile in a weight ratio of styrene to acrylonitrile of from about 80:20 to about 50:50.

37. The process of Claim 32, wherein (3) said ethylenically unsaturated monomers are present in an amount of at least about 30 % by weight, based on 100% by weight of the polymer polyol.

5

38. The process of Claim 32, wherein (4) said free-radical polymerization initiator is selected from the group consisting of alkyl hydroperoxides, aryl hydroperoxides, persulfates, perborates, percarbonates, azo compounds and mixtures thereof.

10

39. The process of Claim 32, wherein (5) said chain transfer agent is selected from the group consisting of isopropanol, ethanol, tert-butanol, toluene, ethylbenzene, triethylamine, dodecylmercaptan, octadecylmercaptan, carbon tetrachloride, carbon tetrabromide, chloroform, methylene chloride and mixtures thereof.

15

40. A polymer polyol comprising the free-radical polymerization product of:

- (1) a base polyol;
- 20 (2) the pre-formed stabilizer of Claim 22;
and
- (3) at least one ethylenically unsaturated monomer;
in the presence of
- (4) at least one free-radical polymerization initiator;
- 25 and, optionally,
- (5) a chain transfer agent.

41. The polymer polyol of Claim 40, wherein the resultant polymer polyol has a solids content of 30 to 60% by weight and a viscosity of from about 2,000 to about 10,000 cSt.

30

42. The polymer polyol of Claim 40, wherein (1) said base polyol comprises a polyether polyol having a functionality ranging from about 2 to about 8, an OH number ranging from about 10 to about 180, and a molecular weight ranging from greater than about 600 to about 15,000.

5

43. The polymer polyol of Claim 40, wherein (3) said ethylenically unsaturated monomers are selected from the group consisting of styrene, acrylonitrile and mixtures thereof.

10

44. The polymer polyol of Claim 43, wherein (3) said ethylenically unsaturated monomers comprise a mixture of styrene and acrylonitrile in a weight ratio of styrene to acrylonitrile of from about 80:20 to about 50:50.

15

45. The polymer polyol of Claim 40, wherein (3) said ethylenically unsaturated monomers are present in an amount of at least about 30% by weight, based on 100% by weight of the polymer polyol.

20

46. The polymer polyol of Claim 40, wherein (4) said free-radical polymerization initiator is selected from the group consisting of alkyl hydroperoxides, aryl hydroperoxides, persulfates, perborates, percarbonates, azo compounds and mixtures thereof.

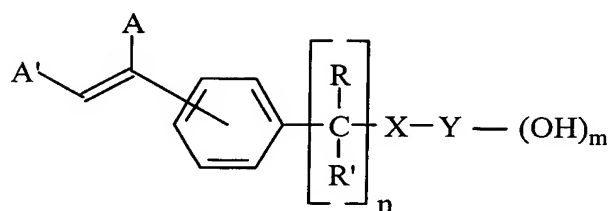
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47. The polymer polyol of Claim 40, wherein (5) said chain transfer agent is selected from the group consisting of isopropanol, ethanol, tert-butanol, toluene, ethylbenzene, triethylamine, dodecylmercaptan, octadecylmercaptan, carbon tetrachloride, carbon tetrabromide, chloroform, methylene chloride and mixtures thereof.

30

48. A process of preparing a polymer polyol comprising:
(A) free-radically polymerizing:
(1) a base polyol;

- (2) an ethylenically unsaturated macromer represented by the formula:



wherein:

- 5 A and A': each independently represent a hydrogen atom, an alkyl radical containing from 1 to 10 carbon atoms which may or may not be substituted with one or more halogen atoms, or an aryl radical containing from 5 to 6 carbon atoms which may or may not be substituted with one or more halogen atoms;
- 10 n: represents 0 or 1;
- X: represents an oxygen atom or a sulfur atom;
- R and R': each independently represent a hydrogen atom, or an alkyl radical containing from 1 to 10 carbon atoms which may or may not be substituted with one or more oxygen atoms or one or more halogen atoms;
- 15 Y: represents a polymerized form of at least one alkylene oxide containing from 2 to 8 carbon atoms, wherein the carbon atoms may be aliphatically bound, aromatically bound, cycloaliphatically bound or a combination thereof;
- 20 and
- 25 m: represents an integer from 1 to 15;
- and

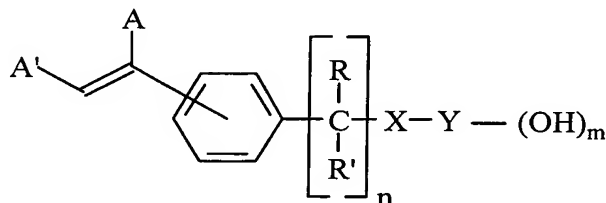
(3) at least one ethylenically unsaturated monomer;
in the presence of

(4) at least one free-radical polymerization initiator;
and, optionally,

5 (5) a chain transfer agent.

49. A polymer polyol comprising the free-radical polymerization
product of:

- 10 (1) a base polyol;
(2) an ethylenically unsaturated macromer



wherein:

- 15 A and A': each independently represent a hydrogen atom, an alkyl radical containing from 1 to 10 carbon atoms which may or may not be substituted with one or more halogen atoms, or an aryl radical containing from 5 to 6 carbon atoms which may or may not be substituted with one or more halogen atoms;
- 20 n: represents 0 or 1;
X: represents an oxygen atom or a sulfur atom;
- 25 R and R': each independently represent a hydrogen atom, or an alkyl radical containing from 1 to 10 carbon atoms which may or may not be substituted with one or more oxygen atoms or one or more halogen atoms;

Y: represents a polymerized form of at least one
alkylene oxide containing from 2 to 8 carbon
atoms, wherein the carbon atoms may be
aliphatically bound, aromatically bound,
cycloaliphatically bound or a combination
thereof;

and

m: represents an integer from 1 to 15;

and

(3) at least one ethylenically unsaturated monomer;

in the presence of

(4) at least one free-radical polymerization initiator;

and, optionally,

(5) a chain transfer agent.

50. A polyurethane comprising the reaction product of

(A) a polyisocyanate component or a prepolymer thereof,
with

(B) an isocyanate-reactive component which comprises the
polymer polyol of Claim 40.

51. A process for the production of a polyurethane comprising
reacting:

(A) a polyisocyanate component or a prepolymer thereof,
with

(B) an isocyanate-reactive component which comprises the
polymer polyol of Claim 40.

52. A polyurethane comprising the reaction product of

(A) a polyisocyanate component or a prepolymer thereof,
with

- (B) an isocyanate-reactive component which comprises the polymer polyol of Claim 49.

53. A process for the production of a polyurethane comprising
 5 reacting:

- (A) a polyisocyanate component or a prepolymer thereof,
 with
- (B) an isocyanate-reactive component which comprises the polymer polyol of Claim 49.